

What is claimed is:

1. A process for separating and recovering valuable metals, comprising the steps of:

leaching a raw material containing at least vanadium oxides and molybdenum oxides with ammonia-containing leaching water to obtain a leached solution containing a vanadium compound and a molybdenum compound,

adding ammonium orthomolybdate to the leached solution to separate and recover the deposited ammonium metavanadate from a first solution for separation,

adding a water-soluble alcohol to the separated solution to separate and recover the deposited ammonium orthomolybdate from a second solution for separation, and

distilling the second solution for separation to separate and recover the water-soluble alcohol and a residue solution, wherein

at least a portion of the residue solution is added to the ammonia-containing leaching water as a portion thereof, and wherein

a portion of the recovered ammonium orthomolybdate and a total of a recovered, water-soluble alcohol are returned to the system for reusing.

2. The process for separating and recovering valuable metals according to claim 1, wherein

the raw material is obtained by roasting a waste catalyst for petroleum desulfurization containing vanadium and

molybdenum under an oxidizing atmosphere.

3. The process for separating and recovering valuable metals according to claim 1 or 2, wherein the water-soluble alcohol is ethanol.

4. The process for separating and recovering valuable metals according to any one of claims 1 to 3, comprising:

a first step of leaching a raw material containing at least vanadium oxides and molybdenum oxides with ammonia-containing leaching water to obtain a leached slurry containing ammonium metavanadate and ammonium orthomolybdate;

a second step of distilling the leached slurry to recover the aqueous ammonia and then remove the residue, thereby obtaining a leached solution;

a third step of adding ammonium orthomolybdate to the leached solution to separate and recover the deposited ammonium metavanadate, thereby obtaining a first solution for separation;

a fourth step of adding ethanol to the first solution for separation to separate and recover the deposited ammonium orthomolybdate to thereby obtain a second solution for separation; and

a fifth step of distilling the second solution for separation to separate and recover the ethanol and a residue solution; wherein

aqueous ammonia recovered in the second step and a residue solution recovered in the fifth step are circulated to the first

step as at least a portion of ammonia-containing leaching water; wherein

a portion of ammonium orthomolybdate recovered in the fourth step is circulated to the third step; and wherein

ethanol recovered in the fifth step is circulated to the fourth step; for reusing.

5. The process for separating and recovering valuable metals according to claim 4, wherein

the ammonia concentration of ammonia-containing leaching water in the first step is 0.1% by weight or more.

6. The process for separating and recovering valuable metals according to claim 4 or 5, wherein

leaching in the first step is carried out in an atmosphere of the presence of oxygen at 50°C or higher.

7. The process for separating and recovering valuable metals according to any one of claims 4 to 6, wherein

the leaching of ammonium metavanadate in the third step is conducted under conditions of the ammonium orthomolybdate concentration being 10% by weight or more based on the weight of the leached solution.

8. The process for separating and recovering valuable metals according to any one of claims 4 to 7, wherein

the leaching of ammonium metavanadate in the third step

is carried out, with the pH being 7 or more and the temperature being cooled to 50°C or less in the leached solution.